

June 7, 1894.

The LORD KELVIN, D.C.L., LL.D., President, in the Chair.

A List of the Presents received was laid on the table, and thanks ordered for them.

The following Papers were read :—

- I. "On the Newtonian Constant of Gravitation." By C. V. BOYS, F.R.S., A.R.S.M., Assistant Professor of Physics, Royal College of Science, South Kensington. Received May 31, 1894.

(Abstract.)

The Newtonian constant of gravitation G , *i.e.*, the force in dynes between 2 grams of matter 1 cm. apart, has been determined with a very accurately constructed piece of apparatus, designed on the lines which I laid down in my paper on the Cavendish experiment ('Roy. Soc. Proc.', vol. 46, p. 293). The important dimensions are approximately—

Distance between centres of lead balls <i>in plan</i> ..	6 in.
" gold " ..	0.9 in.
Diameter of lead balls	$4\frac{1}{4}$ in.
" gold "	0.2 and 0.25 in.
Difference of level between right and left sides .	6 in.

The lead balls were hung by phosphor bronze wires from pillars in the lid of the apparatus, and the gold balls by quartz fibres from the ends of the "beam mirror." The beam mirror was supported by a quartz fibre, 17 in. from a torsion head. An elaborate system of screens protected the apparatus from temperature variations.

An "optical compass" of extreme precision was employed in measuring the horizontal distances between the fibres and between the wires, which alone among the geometrical magnitudes need be known with a very high degree of precision.

The scale was 9 ft. long, divided into 50ths of an inch. It was placed at a distance equal to 14,000 divisions. It could be read with certainty to 1/10 division. The deflections varied according to the circumstances of each experiment from 351 to 577 divisions, and the squares of the periods from 35,431 to 58,519 secs.²

K 2

The experiments were carried out by permission of Professor Clifton, under the Clarendon Laboratory, at Oxford.

The result is for

G , the Newtonian constant of gravitation. 6.6576×10^{-8}

Δ , the mean density of the earth 5.5270.

II. "On the Recurrent Images following Visual Impressions."

By SHELFORD BIDWELL, M.A., LL.B., F.R.S. Received March 27, 1894.

The earliest recorded observation which I have been able to find of a certain curious phenomenon associated with optical after-images is that of Professor C. A. Young, who published a note on the subject in the year 1872, and proposed that the phenomena should be called "recurrent vision."* He noticed that when a powerful Leyden jar discharge took place in a darkened room, any conspicuous object was seen twice at least, with an interval of a little less than a quarter of a second; often it was seen a third time and sometimes even a fourth. He thought that the phenomenon suggested the idea of a reflection of the nervous impulse at the nerve extremities, as if the intense impression upon the retina, after being the first time propagated to the brain, was reflected back to the retina and thence again to the brain, thus renewing the sensation of vision.

A few months later an account of two experiments on the same subject was published by Mr. A. S. Davis.† In the first, a piece of charcoal, one end of which was red-hot, was waved about so as to describe an ellipse or circle a few inches in diameter. A blue image of the burning end was seen following the charcoal at a short distance behind it, the space between the charcoal and its image being absolutely dark. The interval of time after which the sensation of blue light succeeded the primary sensation was estimated to be about a fifth of a second. The other experiment was made with a piece of apparatus resembling a photographic instantaneous shutter. The shutter was interposed between the observer's eye and the sky and was covered with pieces of coloured glass, through which momentary flashes of light were allowed to pass. It was found that each flash was, after a short interval, generally succeeded by a recurrent image, the colour of which was quite different from that of the glass. The results of Mr. Davis's observations are summarised below.

Mr. Davis remarks that except as regards the red glass, the recurrent colour does not differ much from the complementary colour,

* 'Phil. Mag,' vol. 43 (1872), p. 343.

† *Ibid.*, vol. 44 (1872), p. 526.